AGREEMENT

This Agreement is made by and between the American Association of State Highway and Transportation Officials, Inc. a corporation of the District of Columbia, with offices at 444 N. Capitol St. N.W., Suite 249, Washington, D.C. 20001, hereinafter referred to as the "ASSOCIATION," and Arizona Department of Transportation, with offices at 206 South 17th Avenue, Phoenix, Arizona, hereinafter referred to as the "MEMBER DEPARTMENT."

WITNESSETH

Whereas, the ASSOCIATION is operating the National Transportation Product Evaluation Program, hereinafter referred to as the "NTPEP", which requires that testing of certain materials, products and devices be carried out and reported in a prescribed manner approved by the ASSOCIATION; and

Whereas, the MEMBER DEPARTMENT is willing to carry out testing of certain materials, products and devices as specified herein, in accordance with the procedures established by the ASSOCIATION for the NTPEP:

Now, Therefore, in consideration of the mutual covenants and agreements hereinafter set forth, the sufficiency of which is hereby acknowledged, the ASSOCIATION and the MEMBER DEPARTMENT agree as follows:

1. **Technical Assistance**

(a) The MEMBER DEPARTMENT shall do the test deck evaluations and furnish the data to Louisiana Department of Transportation and Development as outlined in the attached "Project Work Plan for the Field and Laboratory Evaluation of Retroreflective Roll Up Signing Materials," hereinafter referred to as the "Project Work Plan," which is hereby incorporated into this Agreement.

(b) The MEMBER DEPARTMENT is equipped and qualified to perform the tasks described in Section 1(a).

(c) The MEMBER DEPARTMENT shall furnish all necessary personnel, materials, facilities, equipment, service and all other resources and capabilities necessary or desirable to complete the tasks described in Section 1(a).

(d) The MEMBER DEPARTMENT agrees in performing the tasks described in Section 1(a), it will do the work in an acceptable workmanlike manner, as determined by the ASSOCIATION and in conformance with general practice as recognized by the state departments of highways and transportation that comprise the ASSOCIATION.

2. **Period of Performance**

(a) The MEMBER DEPARTMENT shall complete the work described in Section 1(a) in accordance with the following general schedule:

1. Test panels will be collected by Louisiana Department of Transportation and Development in April 1998 and shipped from Louisiana to Arizona as soon as practical and the retroreflective roll up signing materials will be installed on the field test decks no later than June 1998.

2. Test data for inclusion in the primary report will be sent to Louisiana Department of Transportation and Development by January 1, 1998 and test data for inclusion in the

supplemental report will be sent to Louisiana Department of Transportation and Development by July 1, 1999.

(b) Whenever the MEMBER DEPARTMENT knows, or reasonably should know or anticipates, that any condition beyond its control is delaying or threatens to delay the timely performance of the testing work and the making of timely reports, it shall advise ASSOCIATION of the actual or expected delay, the cause thereof, and the then expected completion date of the testing work and reports.

3. **Costs and Payments**

(a) The cost per sample (test deck evaluation only) under this Agreement and the Project Work Plan shall be one hundred dollars ($100.00) per sample. This amount is a fixed price per sample tested,(test deck evaluation only) and includes the furnishing of data to Louisiana Department of Transportation and Development for the primary and supplemental reports. It is agreed that in no event will the ASSOCIATION pay the MEMBER DEPARTMENT for costs incurred in excess of the fixed price per sample, unless a mutually acceptable separate written agreement is entered into between the parties.

(b) If testing work under this Agreement is terminated by the ASSOCIATION without cause, the amount payable to the MEMBER DEPARTMENT will be in proportion to the percentage of completion of the testing work as described in Section 1(a), as of the effective date of such termination or suspension.

(c) The ASSOCIATION shall make payments to the MEMBER DEPARTMENT in accordance with the following procedure:

1. The MEMBER DEPARTMENT shall submit an invoice to the ASSOCIATION for reimbursement for the test deck evaluation work when it has completed all the evaluations on the samples and furnished data to Louisiana for all the approved products as identified by the NTPEP Coordinator at the fee schedule outlined in Section 3(a) above, payable to the MEMBER DEPARTMENT under this Agreement, and the invoice being supported with accepted accounting principles and procedures.

2. Upon written request by and at the expense of the ASSOCIATION, the MEMBER DEPARTMENT shall permit a designated representative of the ASSOCIATION to inspect, copy and audit the MEMBER DEPARTMENT's books and records relating to the performance of this Agreement.

4. **Stop Work Order**

The ASSOCIATION may, upon not less than a ten day written notice to the MEMBER DEPARTMENT, require the MEMBER DEPARTMENT to stop all, or any part of the work called for by this Agreement. Upon receipt of such a stop work order, the MEMBER DEPARTMENT agrees to comply with its terms and take all reasonable steps to minimize the incurring of additional costs allocated to the work covered by the stop work order during the period of work stoppage.

5. **Termination**

(a) This Agreement may be terminated by the ASSOCIATION with a 30-day written notice to the MEMBER DEPARTMENT. In the event of termination by the ASSOCIATION without cause, the MEMBER DEPARTMENT shall be paid all costs and obligations incurred in accordance with this Agreement prior to the date of termination. Such reimbursement, together with other

payments already made, shall not exceed the per sample cost times the number of samples approved for testing by the NTPEP Coordinator.

(b) This Agreement may be terminated by the MEMBER DEPARTMENT with a 30-day written notice to the ASSOCIATION.

(c) Upon termination of the Agreement prior to its full term, the MEMBER DEPARTMENT agrees to provide to the ASSOCIATION all data collected up to the time of termination, and to provide required reports through such termination date.

6. **Reports**

(a) Interim reports shall be prepared and delivered to the ASSOCIATION as required in the Project Work Plan.

(b) After completion of the testing work, or upon termination of this Agreement under Section 5, the MEMBER DEPARTMENT shall make a final reporting in the manner described in the Project Work Plan.

7. **Indemnification**

(a) To the Extent provided by law, the MEMBER DEPARTMENT hereby assumes its responsibilities for any loss resulting from bodily injuries (including death) or damages to property, arising out of any act or failure to act on the MEMBER DEPARTMENT's part, or the part of any employee of the MEMBER DEPARTMENT in the performance of the work undertaken under this agreement and contract.

(b) To the Extent provided by law, the ASSOCIATION hereby assumes its responsibilities for any loss resulting from bodily injuries (including death) or damages to property, arising out of any act or failure to act on the ASSOCIATION's part, or the part of any employee of the ASSOCIATION in the performance of the work undertaken under this agreement and contract.

8. **Proprietary Rights to Data**

It is agreed that the ASSOCIATION shall be the owner of and shall have the exclusive proprietary rights, to the exclusion of the MEMBER DEPARTMENT, to all data and reports resulting from this Agreement, shall hold copyright thereto, and have the exclusive right to publish, disclose, disseminate and use in whole or in part any data and information received or developed under this Agreement.

9. **Term of the Agreement**

The term of this Agreement shall be for the period as stated in the Project Work Plan, measured from the effective date of the Agreement.

10. **Effective Date**

This Agreement shall become binding on the parties hereto and of full force and effect upon the signing thereof by the duly authorized officials for the ASSOCIATION and the MEMBER DEPARTMENT, the effective date being that upon which the last party hereto executes the Agreement as stated below.

11. **Jurisdiction**

This Agreement shall be construed in accordance with and governed by the laws of the District of Columbia and the State of Arizona.

12. **Interpretation**

Where interpretation of the Project Work Plan and the terms of this Agreement becomes necessary, recourse shall first be had to the operating procedures established by the ASSOCIATION for the NTPEP, including the appeals process thereof. Such operating procedures shall contain a provision for arbitration.

13. **Completeness**

This Agreement is the complete and exclusive statement of the arrangement between the parties, and supersedes all proposals, oral or written, and all other communications between the parties relating to the subject matter thereof. It may be amended from time to time in writing by the mutual consent of the parties hereto.

14. **Communications**

All communications concerning this Agreement, including invoices and reports, shall be sent to:

For the ASSOCIATION:

Steven E. Lenker
Engineering Project Coordinator
AASHTO
444 N. Capitol St. NW - Suite 249
Washington, D.C. 20001

For the MEMBER DEPARTMENT:

Mr. Oscar Mousavi
Assistant State Engineer
Materials Group
Arizona Department of Transportation
1221 North 21st Avenue
Phoenix, Arizona 85009

In Witness Whereof, the parties have set their hands and seals by their duly authorized agents and representative on the day and year below written:

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, INC.

Witness _____ By: _____

Date 2-27-98 Title _____

(SEAL)

ARIZONA DEPARTMENT OF TRANSPORTATION

Witness _____ By: _____

PETER L. ENO
Contract Administrator

EDWARD D. WRIGHT
Deputy State Engineer

Date 2/11/98 Title _____

(SEAL)

PROJECT WORK PLAN FOR THE

FIELD AND LABORATORY EVALUATION OF

RETROREFLECTIVE ROLL UP SIGNING MATERIALS

October 1997

FIELD AND LABORATORY EVALUATIONS OF RETROREFLECTIVE ROLL UP SIGNING MATERIALS

Manufacturers of retroreflective roll up signing materials wishing to participate in the AASHTO National Transportation Product Evaluation Program (NTPEP) must submit a product evaluation form (PEF) to the AASHTO NTPEP Coordinator by the appropriate deadline. The Product Evaluation Form must include Material Safety Data Sheets for the sheeting and process color inks (if submitted) along with other pertinent information. The AASHTO NTPEP Coordinator will assign each material an SSM-designation number.

The manufacturer will be notified by mail of the NTPEP Coordinator's decision to test their material. At a later date the manufacturer will also be notified by the Louisiana Department of Transportation and Development (LDOTD) about where to ship the material for testing. Manufacturers will submit prefabricated 100 mm X 300 mm test specimen with suitably sealed edges. Manufacturers will also submit a 1 meter wide by 4 meters length of the sheeting from which the test specimens were fabricated. Ink, if submitted, will be applied by the manufacturer.

The samples must be clearly labeled with the assigned SSM-number. The sample identification should include lot no., batch no., drum no., etc. The samples of material must arrive at the Lead State (LDOTD) by April 1.

FIELD EVALUATIONS--TEST DECK LOCATIONS

A set of test specimens will be evaluated on the following AASHTO NTPEP test decks: one in Baton Rouge, Louisiana, one in St. Paul, Minnesota, one in Phoenix, Arizona. A test deck consists of a number of outdoor exposure racks facing south and inclined at an angle of 45 degrees from the horizontal as stated in ASTM G7-96. All exposures shall be unbacked as described in Section 5.5.1 of ASTM G7-96.

1. Each test deck will receive three specimens for each sample supplied and labeled xA, xB, and xC, except for Arizona which will receive nine specimens labeled x1A, x1B, x1C, x2A, x2B, x2C, x3A, x3B, x3C. The specimen designations will be provided by the Lead State Coordinator. Louisiana will evaluate all of Arizona's specimens for measurement of coefficient of retroreflection in the light tunnel, and daytime color, according to Sections 3A and 3B. Once Arizona's specimens have been tested, they will be shipped to Arizona for measurement using their portable reflectometer and visual evaluation prior to the A and B specimens being placed on the Arizona test deck.

2. On receipt, each specimen will be examined closely for any flaws or damage which may have occurred during fabrication or shipping, and measured to the nearest 1 mm. for initial dimensions. Notes on flaws (if any) will be recorded on data sheets so that they can be distinguished from changes or damage due to exposure.

3. Louisiana and Minnesota will conduct the following evaluations prior to exposure and after 1,2,3,4,5,6,9 and 12 months exposure.

A. Coefficient of Retroreflection values for each specimen will be measured in a 15 or 30 meter Light Tunnel in accordance with ASTM D4956-95, Subsection 8.3. The Coefficient of Retroreflection value will be recorded at an observation angle of 0.2 degrees and an entrance angle of -4 degrees and +30 degrees. The rotational angle will be 0 and 90 degrees. The specimen position for the rotational angle of 0 degrees is vertical with the specimen label at the top.

B. Chromaticity (color coordinates and daytime luminance) will be measured in accordance with ASTM D4956-95, Subsection 8.4 or ASTM E 991-90 for fluorescent materials.

C. Portable reflectometer readings will be taken. Each specimen shall be measured at the top, middle, and bottom. The average of these readings for each specimen shall be recorded on the report.

D. Visual comparison with the control specimen will be made for colorfastness, blistering and cracking. The dimensions for the specimen will be measured for comparison with initial dimensions for assessment of shrinkage and expansion.

The schedule for these evaluations is summarized in Table 1. The specimens shall be removed from the racks and brought into the laboratory to equilibrate as specified in ASTM D 4956-95 Section 8.1 prior to making measurements.

4. Arizona will perform monthly portable reflectometer readings and visual evaluations as described in Sections 3C and 3D. After these evaluations have been performed at 3, 6 and 12 months of exposure, two exposed specimens and one control will be shipped to Louisiana for measurement of retroreflectivity in the light tunnel, and chromaticity (color coordinates and daytime luminance) according to Sections 3A and 3B. The removed specimens will not be returned to the test deck.

   The schedule for these evaluations is summarized in Table 1. The specimens shall be removed from the racks and brought into the laboratory to equilibrate as specified in ASTM D 4956-95 Section 8.1 prior to making measurements.

5. Specimens labeled xA and xB will be placed on the outdoor exposure racks on May 1, or as soon as possible thereafter. In mounting the specimens, the physical integrity of the specimen must be maintained i.e. holes should not be made in the specimen to attach wires, ties, etc. to affix to the test deck. A recommended attachment device is shown in Figure 1.

6. Specimens labeled xC will be stored in a file cabinet or other suitable storage place protected from the sunlight and weather.

7. Weather information from the National Weather Service station nearest each test deck will be summarized and recorded in the final report. The data for each month shall include maximum temperature (°C), minimum temperature (°C), average high/low (°C) and total rainfall (mm), total snowfall if applicable (mm), average daily mean % relative humidity, total solar radiation on a horizontal surface (MJ/m^2) if available.

8. The Lead State (Louisiana) will provide each testing state with a floppy disk containing the

desired Excel report format. The data will be entered by the testing state and a copy of the floppy disk will be sent to Louisiana for report compilation within 45 days of the end of the 6 month and 1 year exposure periods. The compiled report will be submitted to the AASHTO NTPEP Coordinator for publication of a primary report after 6 months exposure and a supplemental report after 12 months exposure.

Table 1
Schedule of Field Evaluations

Outdoor Exposure @ 45° south, months	Phoenix, AZ Test Deck[1]	Baton Rouge, LA Test Deck	St. Paul, MN Test Deck
0	C/R/P/V	C/R/P/V	C/R/P/V
1	P/V	C/R/P/V	C/R/P/V
2	P/V	C/R/P/V	C/R/P/V
3	C/R/P/V	C/R/P/V	C/R/P/V
4	P/V	C/R/P/V	C/R/P/V
5	P/V	C/R/P/V	C/R/P/V
6	C/R/P/V	C/R/P/V	C/R/P/V
9	P/V	C/R/P/V	C/R/P/V
12	C/R/P/V	C/R/P/V	C/R/P/V

[1]The color coordinate data and light tunnel retroreflectivity data for the Phoenix, AZ test deck will be obtained by the Louisiana DOTD laboratory at 0, 3, 6 and 12 months.
C—Color coordinate and daytime luminance data
R—Retroreflectivity data obtained in light tunnel
P—Portable reflectometer data
V—Visual evaluation

VISUAL RATING SYSTEM

COLORFASTNESS - L-S-300C SUBSECTION 4.4.9.1

This Colorfastness rating is taken entirely from L-S-300C, Subsection 4.4.9.1 except the evaluation is done without wetting samples. Holding dry control specimen C beside dry test deck specimen A and B evaluate them as follows:

Excellent - No perceptible change in color

Good - Perceptible change in color

Fair - Appreciable change in color

Poor - Color not recognizable as original color

Appreciable change in color means a change that is immediately noticeable when making the comparison. It should be noted that the difference between the "Excellent" and "Good" categories is small. As with any subjective evaluation, it is dependent on the operator and light conditions at the test site.

SHRINKAGE - L-S-300C SUBSECTION 4.4.9.2

Shrinkage will be reported as the number of mm change in dimensions from those originally recorded. Expansion will also be noted in this category.

CRACKING

This category will evaluate sheeting or the ink on sheeting for cracking, crazing or scaling. An abbreviation will be made on the report form. The explanation of the abbreviation will appear in the Notes on Visual Data Collection.

BLISTERING

This category will evaluate sheeting or the ink on sheeting for blisters, delamination or edge lifting. An abbreviation will be made on the report form. The explanation of the abbreviation will appear in the Notes on Visual Data Collection.

LABORATORY EVALUATIONS

The 1 meter wide by 4 meters length of the sheeting from which the test specimen were fabricated will be used by the Louisiana DOTD Materials and Testing Laboratory for evaluation. Test methods used in evaluation of the sign sheeting materials shall be as listed in Table 2.

TABLE 21

Tests Performed	ASTM D4956-95		ASTM D4956-95
	Flexibility	8.9	
	Daytime Color: for Fluorescent colors:	8.4 E 991-90	
	Luminance Factor (Y%): Fluorescent colors	8.4 E 991-90	
	Specular Gloss	8.12	
	Coefficient of Retroreflection	8.3	

FIGURE 1: Diagram showing clamping bars used for mounting roll-up sign specimens to test rack for outdoor exposure. Each bar is 6061T6 aluminum, 25 mm x 200 mm x 2 mm. When attaching to test rack, clamped specimen is oriented with long axis horizontal so that the bolts used to clamp specimen ends do not interfere with attachment to test rack.